

We claim:

1. A balancing valve for use in fluid circulation and supply systems comprising,

a valve body having an axially extending fluid passage therethrough, the fluid passage including a fluid inlet passage defined by a first sidewall portion and a fluid outlet passage defined by a second sidewall portion,

the fluid inlet portion including an enlarged cylindrical portion having a first diameter, and a reduced cylindrical portion having a second diameter selected smaller than the first diameter,

a first measuring device for measuring fluid pressure in said enlarged cylindrical portion and

a second measuring device for measuring fluid pressure in said reduced cylindrical portion,

at least one fin member disposed in said outlet passage, each of the fin members projecting inwardly into said fluid outlet passage from spaced locations along said second sidewall portion,

a valve seat intermediate said fluid inlet and fluid outlet passages and wherein the reduced cylindrical portion is disposed intermediate said enlarged cylindrical portion and said valve seat, and

a sealing member being selectively movable towards and away from said valve seat to regulate fluid flow from said fluid inlet passage to said fluid outlet passage.
2. The balancing valve of claim 1 wherein the second sidewall portion extends radially about the axis, the fin members being axially elongated and extend from said second sidewall portion at radially spaced locations partway towards said axis.

3. The balancing valve of claim 2 comprising a pair of fin members, wherein the fin members are spaced radially between about 40 and 140° apart along said second sidewall portion from each other.

4. The balancing valve of claim 3 wherein said fin members extend substantially the axial length of said fluid outlet portion.

5. The balancing valve of claim 4 wherein said valve seat comprises an annular shoulder extending radially about said axis inclined in a plane, said plane being oriented at an angle of between 30° and 60° relative to said axis,

said balancing valve further including an actuator bore extending partially through said valve body to said valve seat in an orientation generally normal to said plane,

a valve stem having a proximal end and a distal end being movably disposed in said actuator bore, said sealing member being coupled to said proximal end of the valve stem, and

a handle member secured to the distal end of the valve stem whereby manual movement of the handle selectively moves said valve stem relative to said actuator bore to selectively urge said sealing member towards or away from said valve seat to permit or restrict fluid flow along the fluid passage.

6. The balancing valve of claim 5 wherein said plane is inclined at an orientation of about 45° relative to said axis.

7. The balancing valve of claim 1 wherein said valve further comprises a first bore extending through said body and open to said enlarged cylindrical portion, the first bore extending along a first bore axis and a second bore extending through said body and open to said reduced cylindrical portion, the second bore extending along a second bore axis,

each of the first bore axis, the second bore axis and the fluid passage axis being substantially co-planar,

the first measuring device comprising a first pressure valve fluidically coupled to said first bore, and the second measuring device comprising a second pressure valve fluidically coupled to the second bore.

8. The balancing valve of claim 5 wherein said valve further comprises a first bore extending through said body and open to said enlarged cylindrical portion, and a second bore extending through said body and open to said reduced cylindrical portion,

the first measuring device comprising a first pressure valve fluidically coupled to said first bore, and the second measuring device comprising a second pressure valve fluidically coupled to the second bore.

9. The balancing valve of claim 7 wherein said body and said fin members are forged as a simple unit.

10. The balancing valve of claim 5 wherein said first sidewall portion further includes a frustoconical section providing a transition between said enlarged cylindrical portion and said reduced cylindrical portion, said frustoconical section being inclined at an angle of 40 to 50° relative to said axis.

11. The balancing valve of claim 10 wherein said second diameter has a size selected at between about 50 and 70% of said first diameter.

12. The balancing valve of claim 1 wherein each of said fin members comprise part of an insert adapted for fitted axial placement in said fluid outlet passage.

13. A fluid circuit balancing valve comprising

a valve body defining a fluid flow inlet passage and a fluid flow outlet passage,

the fluid flow outlet passage extending along an axis,

a pair of fin members being disposed in said outlet passage, the fin members projecting partway towards said axis from radially spaced locations along said body,

a valve seat intermediate said inlet and outlet passages,

a sealing member being selectively movable towards and away from said valve seat to prevent or permit fluid flow from said inlet passage to said outlet passage.

14. The balancing valve as claimed in claim 13 wherein the fluid flow inlet passage is axially aligned with the fluid flow outlet passage, the fluid flow inlet passage further including an enlarged cylindrical portion having a first diameter, and a reduced cylindrical portion having a second diameter selected smaller than the first diameter, the enlarged and reduced cylindrical portions being axially aligned and concentric about the axis with the reduced cylindrical portion being disposed intermediate said enlarged cylindrical portion and said valve seat,

a first measuring device for measuring fluid pressure in said enlarged cylindrical portion, and

a second measuring device for measuring fluid pressure in said reduced cylindrical portion.

15. The balancing valve as claimed in claim 13 further comprising a first bore extending through said valve body and open to said enlarged cylindrical portion, and a second bore extending through said valve body and open to said reduced cylindrical portion,

the first measuring device comprising a first pressure valve fluidically coupled to said first bore, and

the second measuring device comprising a second pressure valve fluidically coupled to the second bore.

16. The balancing valve as claimed in claim 15 wherein said fluid flow inlet passage further includes a frustoconical section providing a transition between said enlarged cylindrical portion and said reduced cylindrical portion, said frustoconical section being characterized by a sidewall inclined at an angle of 40 to 50° relative to said axis.

17. The balancing valve of claim 16 wherein said second diameter has a size selected at between 50 and 70° of said first diameter.

18. A valve for balancing fluid flow in a fluid flow system, the valve comprising,

a valve body having an axially extending fluid passage therethrough, the fluid passage including a fluid inlet passage defined by a first sidewall portion and a fluid outlet passage defined by a second sidewall portion, each of the first and second sidewall portions extending radially about the axis,

the fluid inlet portion including an enlarged cylindrical portion having a first diameter, and a reduced cylindrical portion having a second diameter selected smaller than the first diameter,

a first bore extending through said body and open to said enlarged cylindrical portion, and a second bore extending through said body and open to said reduced cylindrical portion,

a first pressure valve fluidically coupled to said first bore, and a second pressure valve fluidically coupled to the second bore,

a pair of axially elongated fin members disposed in said outlet passage, the fin members extending partway towards said axis from locations spaced radially between about 45° and 135° apart along said second sidewall portion,

a valve seat intermediate said fluid inlet and fluid outlet passages and wherein the reduced cylindrical portion is disposed intermediate said enlarged cylindrical portion and said valve seat, and

a sealing member being selectively movable towards and away from said valve seat to regulate fluid flow from said fluid inlet passage to said fluid outlet passage.

19. The balancing valve of claim 18 wherein said second diameter has a size selected at between about 50 and 70% of said first diameter, and said first sidewall portion further includes a frustoconical section providing a transition between said enlarged cylindrical portion and said

reduced cylindrical portion, said frustoconical section being inclined at an angle of 35° to 55° relative to said axis.

20. The valve as claimed in claim 19 wherein said valve seat comprises an annular shoulder extending about said axis, said shoulder being inclined at an angle of between 30° and 60° relative to said axis,

said balancing valve further including an actuator bore extending open to said valve seat,

a valve stem having a proximal end and a distal end being movably disposed in said actuator bore, said sealing member being coupled to said proximal end of the valve stem for movement therewith, and

a handle member secured to the distal end of the valve stem whereby manual movement of the handle selectively moves said valve stem relative to said actuator bore to selectively urge said sealing member towards or away from said valve seat to permit or restrict fluid flow along the fluid passage.

21. The valve as claimed in claim 20 further comprising,

a collar movably retaining said valve stem in said actuator bore, and

a sealing assembly providing a substantially fluid-tight seal between said collar and said valve stem, said sealing assembly comprising a plurality of axially disposed sealing members sized to rotatably engage at least one of an exterior portion of said valve stem and an interior portion of said collar.

22. The valve as claimed in claim 21 wherein said axially disposed sealing members are resiliently compressible O-rings, at least one of said O-rings having a cross-sectional diameter which is larger than a cross-sectional diameter of another.

23. The valve as claimed in claim 22 wherein said sealing assembly comprises three axially disposed O-rings.

24. The valve as claimed in claim 23 wherein the O-ring having the larger cross-sectional diameter is positioned remote from said valve seat.